May 26, 1931. P. WOLF 1,806,868

MINER'S LAMP

Filed April 28, 1930

Fig. 1

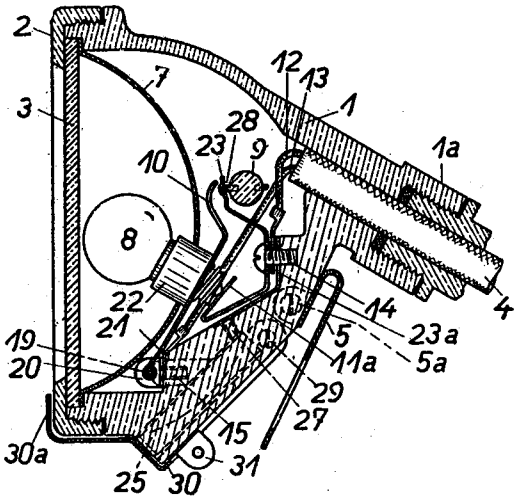


Fig. 2

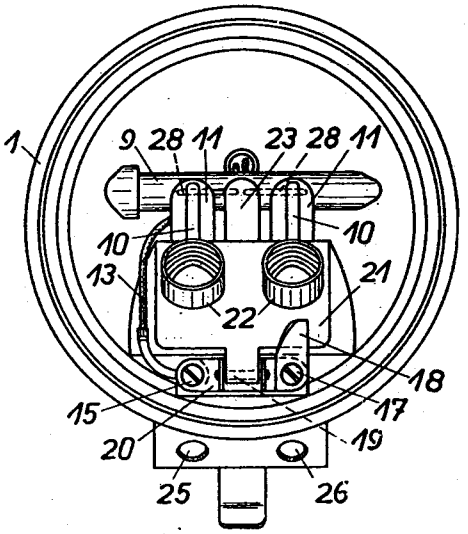


Fig. 3

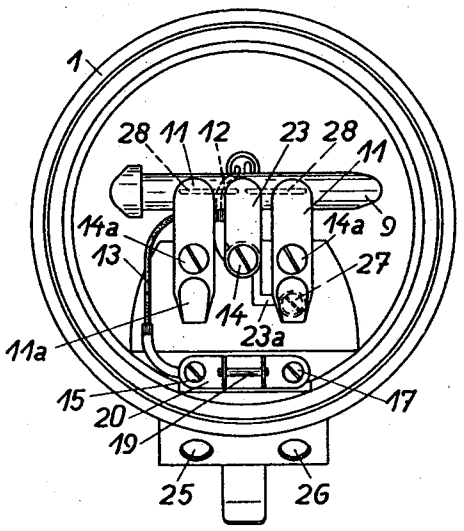
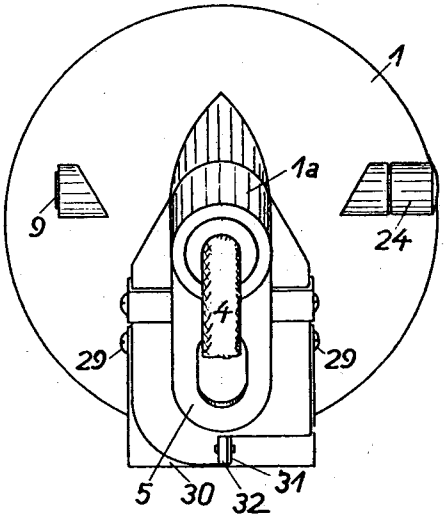


Fig. 4



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UNITED STATES PATENT OFFICE

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MINER'S LAMP

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My invention relates to electric lamps for accumulator working, and more particularly to a head lamp for miners, which consists of the lamp itself to be carried on the miner's head gear and an accumulator, to be carried on the back or on a belt, the accumulator being connected with the lamp itself by a cable.

The object of my invention is in general to make such lamps particularly suitable for use in mines, and the invention is particularly directed towards providing a simple construction, that will give the minimum possible occasion for disturbances, and also to protect the lamp against unauthorized opening, and other unauthorized treatment by the miner, as a result of which explosions of fire damp might be brought about, while enabling the accumulator to be conveniently charged without separating it from the lamp. The invention further provides for switching off the lamp or lamps in the event of their being endangered by a shock.

In pursuance of these objects the lamp casing contains firstly a rotary switch, consisting of a non-conducting spindle rotatable from outside, with conducting projections in co-operation with stationary contact springs fitted into the lamp casing, the said contact springs being conductively connected in pairs by the said conducting projections according to the angular position of the spindle, for the purpose of effecting the various switching operations requisite for operating the lamp.

In the simplest case only one lamp bulb is provided, which has to be switched on and off. There may however be provided a two-filament lamp, or else two lamp bulbs may be provided. In these cases the projections on the switch spindle and the connections associated with the contact springs are so arranged that the filaments or lamp bulbs can be switched on individually or collectively, or else one filament or the other, or one lamp or the other of different candle power, may be switched on alternatively. All this admits of being easily obtained with the rotary switch with its conducting projections and suitably arranged contact springs.

In order furthermore to make the lamp permanently currentless in the event of damage, or even in the case of a shock seriously endangering the lamp though not already harming it, and thus reliably preventing the ignition of fire damp, a very simple and reliably acting means is employed. It consists in locating the lamp holder or holders upon a pivotally arranged plate, which is held by a spring in the normal position, which is determined by a stop. The plate is connected with one pole of the current supply, whereby the conductive connection with the side contact of the lamp base cap, that is, with the screw-thread of the Edison screw lamp holder or the transverse pins of the Swan lamp base, is established. The other pole of the current supply is conductively connected by a contact spring with the end pole of the lamp base cap. This contact spring may at the same time be the spring that presses the plate against the stop and thereby holds it in its normal position. This second pole of the current supply is connected at the other end with a contact spring which is touched by a contact finger on the plate when the latter is deflected out of its normal position against the pressure of the spring. A short circuit is thereby established between the two poles of the current supply, which makes the lamp permanently currentless by virtue of a fuse interposed in the path of the current and fitted into the lamp casing or even into the accumulator, the said fuse blowing upon the occurrence of a short circuit.

In order to be able to charge the accumulator through the lamp, and thus save opening the accumulator casing every time, I have furthermore provided in the lamp casing two plug sockets, which are each connected with one pole of the current supply to the lamp. The accumulator can thus be charged if the plugs of a plug contact of known arrangement are introduced into these sockets, the said plug contact closing the charging circuit. Now it would be hazardous if current could be taken from the accumulator by introducing metallic members into the plug sockets in mines rendered dangerous by fire damp. I therefore provide a closure member which

covers the apertures of the plug sockets, and which in its turn can be secured by lead sealing or even by the magnetic lock which is known in connection with miners' lamps.

On the same ground also, the opening of the lamp casing by the miner is to be prevented. For this purpose I provide a member which prevents the loosening of the screw ring for the cover glass of the lamp casing, and which in its turn can be secured by lead sealing or by a magnetic lock.

It is particularly advantageous if the two locking members or securing means just dealt with are united into one. It is then only necessary to provide one lead seal or one magnetic lock. This combination may for example be effected by arranging a flap rocking about a fixed point on the casing and covering on the one hand the apertures of the plug sleeves, and on the other hand engaging with a finger over the said screw ring.

The invention is illustrated by way of example in the accompanying drawings, in which

Figure 1 is a side sectional elevation of a lamp according to the invention,

Figure 2 is a front view, with the frame ring, the disc, the radiation screen and the lamps removed,

Figure 3 a front view with the lamp holders and the plate in which they are mounted removed, and

Figure 4 a back view.

The lamp casing 1 consists of a hemispherical hollow body of insulating material and a screw-threaded tubular coupling member 1*a* on its rear side. In this body is supported the switch spindle 9, of insulating material, on which conducting projections 28 are provided. By the coupling member 1*a* the cable 4, with the conductors 12 and 13, is introduced into the lamp.

The conductor 12 leads to a screw 14, by which the spring 23 is held fast. The screws 14*a* hold springs 11 and 11*a*, which may also be in one piece. The springs 11*a* press against the central poles of the lamps 8.

The conductor 13 leads to a screw 15, which, together with a screw 17, holds the bearing piece 20 firmly to the lamp casing. To the piece 20 is secured a pin 19, round which a plate 21 can swing. It is however pressed by the springs 11*a* against a stop piece 18 secured by the screw 17, and in this way held fast in a particular position under normal circumstances. Upon the plate 21 are mounted the holder rings 22 for the lamps 8. Two finger-like projections on the plate 21 are located under normal circumstances a short distance above the springs 11.

On the under side of the lamp casing are located plug sockets 25 and 26. The socket 25 is conductively connected with the conductor 13 by a projection into which a screw 15 is screwed. The electrical connection of the socket 26 with the conductor 12 is established by a screw 27, through a member 23*a* and the screw 14. With the screws 29 is rotatably connected a closure cover 30, which covers the sockets 25 and 26 and at the same time engages with a finger 30*a* over the frame ring 2.

If the accumulator associated with the lamp is to be charged without having to interrupt the cable connection between it and the lamp or open the accumulator, the lead seal is released at 31, and the closure cover 30 rotated about the screw 29, so that the plug sockets 25, 26 become accessible. Since the latter, as described above, are in conductive communication with the conductors 12 and 13, and therefore with the poles of the accumulator, the accumulator can be charged through the lamp from a source of current by introducing a plug member into the sockets 25, 26. On the front aperture of the lamp casing is mounted the reflector 7 and the glass plate 3, which are held fast by the frame ring 2.

If it is desired to switch on the right-hand or the left-hand lamp it is only necessary so to rotate the switch spindle 9 that the conducting projection 28 conductively connects the spring 23 with one of the springs 11. The circuit is then as follows:—

From the accumulator to the conductor 12 by way of the spring 23, the contact piece 28 to the springs 11 and 11*a* and to the terminal pole of the lamp; from the lamp holder 22 by way of the plate 21, the piece 20 to the conductor 13 and the back to the accumulator. The spring 11 is therefore connected, when one of the two lamps is switched on, with one pole (conductor 12), by way of the contact piece 28 and the spring 23. The other pole (conductor 13) bears directly on the plate 21, and accordingly also on the finger-like projection 10. If there acts upon the lamps 8 a considerable shock, such as would endanger them, as being capable for instance of breaking the protecting glass or the bulb, or has in fact broken them, the springs 11*a* yield. The plate 21 swings about the pin 19 and the finger-like projections 10 of the plate 21 touch the springs 11, that is to say, a short circuit occurs, which melts a fuse fitted at some other position, for instance on the accumulator. The circuit is therefore permanently interrupted, and the danger of igniting the firedamp when the lamp is smashed is thereby eliminated. In order however to prevent the miner from screwing off the lamp there is fitted a finger 30*a*, which according to the drawing is structurally connected with the closure piece 30 for the plug sockets but might alternatively be separately fitted, and would then of course be protected by securing means of its own, such as a lead seal for example. The lug 31 of the closure member 30, in conjunction with the extension 32 fitted to the lamp casing, enables the locking or

closing member to be secured by means of a lead seal.

The hook 5 secured by means of a screw 5*a* to the lamp casing, is intended for hanging the lamp on the miner's cap.

What I claim is:—

1. An electric lamp adapted to be energized by an accumulator and to be used as a miner's head lamp or for like purposes, comprising a lamp casing, an electric lamp bulb mounted in the casing, current supply conductors entering the lamp casing and adapted to be connected externally to an accumulator, a switch spindle journaled in the casing, means such as a handle for rotating the switch spindle from outside the casing, and means provided on the switch spindle for establishing and interrupting an electric circuit through the lamp bulb and the current supply conductors.

2. An electric lamp adapted to be energized by an accumulator and to be used as a miner's head lamp or for like purposes, comprising a lamp casing, a plurality of electric lamp bulbs mounted in the casing, current supply conductors entering the lamp casing and adapted to be connected outside the lamp casing to an accumulator, a switch journaled in the casing, means such as a handle for rotating the switch spindle from outside the casing, and means provided on the switch spindle for establishing and interrupting electric circuits through the several lamp bulbs and the current supply conductors.

3. An electric lamp adapted to be energized by an accumulator and to be used as a miner's head lamp or for like purposes, comprising a lamp casing, a plurality of electric lamp filaments mounted in the casing, current supply conductors entering the lamp casing and adapted to be connected outside the lamp casing to an accumulator, a switch spindle journaled in the casing, means such as a handle for rotating the switch spindle from outside the casing, and means provided on the switch spindle for establishing and interrupting electric circuits through the several lamp filaments, and the current supply conductors.

4. An electric lamp adapted to be energized by an accumulator and to be used as a miner's head lamp or for like purposes, comprising a lamp casing, a plurality of electric lamp filaments mounted in the casing, current supply conductors entering the lamp casing and adapted to be connected outside the lamp casing to an accumulator, a non-conducting switch spindle journaled in the casing, means such as a handle for rotating the switch spindle from outside the casing, contact springs mounted in the casing, and conducting projections on the switch spindle adapted to place the contact springs in electric connection with one another in pairs in certain positions of the switch spindle, thereby establishing electric circuits through the lamp filaments and the current supply conductors.

5. An electric lamp adapted to be energized by an accumulator and to be used as a miner's head lamp or for like purposes, comprising a lamp casing, a lamp holder plate movably mounted in the casing, a stop against which the lamp holder plate normally bears, a spring tending to hold the lamp holder plate against the stop, lamp holders mounted on the lamp holder plate, a plurality of electric lamp bulbs mounted in the lamp holders, current supply conductors entering the lamp casing and adapted to be connected outside the lamp casing to an accumulator, a switch spindle journaled in the casing, means such as a handle for rotating the switch spindle from outside the casing, means provided on the switch spindle for establishing and interrupting electric circuits through the several lamp bulbs and the current supply conductors, a contact piece adapted to be touched by the yieldingly mounted lamp holder plate in the event of a dangerous shock to the lamp casing, thereby short-circuiting the current supply if such shock occurs when the lamp is alight, and a fuse adapted to melt in the event of the current supply being short-circuited and thereby to disconnect the lamp bulbs permanently from the current supply.

6. An electric lamp adapted to be energized by an accumulator and to be used as a miner's head lamp or for like purposes, comprising a lamp casing, current supply conductors entering the lamp casing and adapted to be connected outside the lamp casing to an accumulator, a conducting lamp holder plate movably mounted in the casing and conductively connected with one of the supply conductors, a stop against which the lamp holder plate normally bears, a spring tending to hold the lamp holder plate against the stop, lamp holders mounted in the lamp holder plate, a plurality of electric lamp bulbs mounted in the lamp holders, each lamp bulb being electrically connected by one terminal with the lamp holder plate, a switch spindle journaled in the casing, means such as a handle for rotating the switch spindle from outside the casing, means provided on the switch spindle for establishing and interrupting electric circuits through the several lamp bulbs and the current supply conductors, a contact spring electrically connected with the other supply conductor and with the other terminal of the lamps when the lamps are switched on, a contact finger on the lamp holder plate normally located in the neighbourhood of the said contact spring and adapted to move into contact therewith in the event of a dangerous shock to the lamp casing, thereby short-circuiting the current

supply if such shock occurs when the lamp is alight, and a fuse adapted to melt in the event of the current supply being short-circuited and thereby to disconnect the lamp bulbs permanently from the current supply.

7. An electric lamp adapted to be energized by an accumulator and to be used as a miner's head lamp or for like purposes, comprising a lamp casing, an electric lamp bulb mounted in the casing, current supply conductors entering the lamp casing and adapted to be connected outside the lamp casing to an accumulator, a switch spindle journaled in the casing, means such as a handle for rotating the switch spindle from outside the casing, means provided on the switch spindle for establishing and interrupting an electric circuit through the lamp bulb and the current supply conductors, and two plug sockets in the lamp casing, each connected with one of the current supply conductors, and adapted to be plugged into a current supply for the purpose of charging the accumulator through the lamp casing.

8. An electric lamp as claimed in claim 7, further comprising a closure member adapted to prevent access to the plug sockets, and means such as a lead seal for preventing unauthorized removal of the closure member.

9. An electric lamp adapted to be energized by an accumulator and to be used as a miner's head lamp or for like purposes, comprising a lamp casing, an electric lamp bulb mounted in the casing, current supply conductors entering the lamp casing and adapted to be connected outside the lamp casing to an accumulator, a switch spindle journaled in the casing, means such as a handle for rotating the switch spindle from outside the casing, means provided on the switch spindle for establishing and interrupting an electric circuit through the lamp bulb and the current supply conductors, a glass plate closing the lamp casing in the front, a screw-threaded frame ring securing the glass plate in position, a locking member adapted to prevent the frame ring from being unscrewed, and means such as a lead seal for preventing unauthorized removal of the locking member.

10. An electric lamp as claimed in claim 7, further comprising a glass plate closing the lamp casing in the front, a screw-threaded frame ring securing the glass plate in position, a closure member adapted to prevent access to the plug sockets and to prevent the frame ring from being unscrewed, and means such as a lead seal for preventing unauthorised removal of the closure member.

11. An electric lamp adapted to be energized by an accumulator and to be used as a miner's head lamp or for like purposes, comprising a lamp casing, an electric lamp bulb mounted in the casing, current supply conductors entering the lamp casing and adapted to be connected outside the lamp casing to an accumulator, means for establishing and interrupting an electric circuit through the lamp bulb and the current supply conductors, two plug sockets in the lamp casing, each connected with one of the current supply conductors, and adapted to be plugged into a current supply for the purpose of charging the accumulator through the lamp casing, a glass plate closing the lamp casing in the front, a screw-threaded frame ring securing the glass plate in position, a closure flap pivoted to the lamp casing and adapted when closed to prevent access to the plug sockets and to prevent the frame ring from being unscrewed, and means such as a lead seal for preventing unauthorized opening of the closure flap.

12. An electric lamp adapted to be energized by an accumulator and to be used as a miner's head lamp or for like purposes, comprising a lamp casing, current supply conductors entering the lamp casing and adapted to be connected outside the lamp casing to an accumulator, a conducting lamp holder plate movably mounted in the casing and conductively connected with one of the supply conductors, a stop against which the lamp holder plate normally bears, a spring tending to hold the lamp holder plate against the stop, lamp holders mounted in the lamp holder plate, a plurality of electric lamp bulbs mounted in the lamp holders, each lamp bulb being electrically connected by one terminal with the lamp holder plate, a non-conducting switch spindle journaled in the casing, means such as a handle for rotating the switch spindle from outside the casing, contact springs mounted in the casing, conducting projections on the switch spindle adapted to place the contact springs in electrical connection with one another in pairs in certain positions of the switch spindle, thereby establishing electric circuits through the lamp filaments and the current supply conductors, a contact spring electrically connected with the other supply conductor and with the other terminal of the lamps when the lamps are switched on, a contact finger on the lamp holder plate normally located in the neighborhood of the said contact spring and adapted to move into contact therewith in the event of a dangerous shock to the lamp casing, thereby short-circuiting the current supply if such shock occurs when the lamp is alight, a fuse adapted to melt in the event of the current supply being short-circuited and thereby to disconnect the lamp bulbs permanently from the current supply, two plug sockets in the lamp casing, each connected with one of the current supply conductors, and adapted to be plugged into a current supply for the purpose of charging the accumulator through the lamp casing, a glass plate closing the lamp casing in the front, a screw-threaded frame ring se-

curing the glass plate in position, a closure flap pivoted to the lamp casing and adapted when closed to prevent access to the plug sockets and to prevent the frame ring from being unscrewed, and means such as a lead seal for preventing unauthorized opening of the closure flap.

In testimony whereof I have signed my name to this specification.

PAUL WOLF.